



## A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE

*"To the solid ground  
Of Nature trusts the mind which builds for aye."*—WORDSWORTH

THURSDAY, NOVEMBER 3, 1881

### A RECENT "FIND" IN BRITISH PALÆONTOLOGY

THE world is but rarely startled nowadays by the discovery of whole groups of new organisms from the rocks of Britain; it is only from the Far West that such surprises come. Two or three generations of active collectors have ransacked our strata so thoroughly that only now and then by some happy chance is a new vein of research opened, the finder of which may be congratulated rather on his good luck than on his special acuteness in observation. Such a vein has recently been struck by the Geological Survey among the Lower Carboniferous rocks of the south of Scotland. Some account of the more important features of this "find" may be of interest to the general reader.

Travellers who enter Scotland from the south, remark that after leaving the plains of the Tweed on the east side, or those of the Solway on the west, they find themselves in a range of hills or uplands, not lofty and picturesque indeed, but with sufficient height and individuality of feature to form a notable barrier between the valleys of the border on the one hand and the Scottish Lowlands on the other. This belt of pastoral high grounds, so bright with the glamour of poetry and romance, has a special interest to the geologist. He can trace it back to its origin about the close of the Silurian period, when it first began to rise out of the sea, and served, by its upheaval, to define one or more of the great inland basins in which the Old Red Sandstone was deposited. From that ancient time down to the present the ridge seems to have formed a barrier between the basins on its northern and southern margin. No doubt it has been enormously worn down in the general denudation of the country, deep valleys have been trenched through it; much of it has now and again been submerged and covered by masses of sedimentary material. Nevertheless it has preserved its existence. Lying along a line of terrestrial weakness, its strata, originally horizontal sheets of mud and sand, piled over each other to a depth of many thousand feet, have been crumpled and corrugated to a vast extent. The

movements by which these contortions were produced have doubtless recurred at many intervals, so that we may conceive them to have in some measure, if not entirely, compensated by occasional elevation for the lowering of the level of the ridge by continuous denudation.

During the early part of the Carboniferous period these southern Silurian uplands of Scotland formed a barrier between the lagoons of the Lowlands and the more open waters to the south which spread over the north and centre of England. That the ridge was not continuous, or at least that there was now some water-way across it or round its end, between the basins on either side, is indicated by the similarity of their fossils. Yet that it formed on the whole a tolerably effective barrier is indicated partly by the marked difference between the corresponding strata on its northern and southern flanks, and partly by the singular series of organic remains to which attention is here called.

For some years past the Geological Survey of Scotland has been engaged in the detailed investigation of the Carboniferous rocks between the Silurian uplands and the English border. The whole region has now been mapped; the maps are partly published, and partly in the hands of the engraver for speedy publication. The rocks have been collected, and their chemical and microscopic analysis is in progress. Their fossils have been gathered from every available stratum, and have already been in large measure named and described. So that materials now exist for a tolerably complete review and comparison of the stratigraphy, petrography, and palæontology of the Carboniferous rocks of the Scottish Border. In the course of the work one particular zone of shale on the banks of the River Esk has been found to possess extraordinary palæontological value. From this stratum where exposed for a few square yards by the edge of the river a larger number of new organisms has been exhumed by the Survey than has been obtained from the entire Carboniferous system of Scotland for years past. As a whole the remains are in an excellent state of preservation. Indeed in some instances they have been so admirably wrapped up in their matrix of fine clay as to retain structures which have never before been recognised in a fossil state.

The more important treasures from the shales of Eskdale and Liddesdale are fishes, crustaceans, and arachnids. The fishes were at once placed in the hands of Dr. R. H. Traquair, whose devotion to fossil ichthyology has made him our *facile princeps* in this department of palæontology. The first part of his report on them, devoted to the Ganoidei, has been completed and is published by the Royal Society of Edinburgh (*Trans. Roy. Soc. Edin.* xxx. (1881), p. 15). He points out the extraordinary interest of the collection, both as opening up an almost entirely new fish-fauna, and as revealing remarkable structural peculiarities in many of the new forms. Out of twenty-eight species of ganoids no fewer than twenty at least are new. Of the sixteen genera in which these species are comprised five are now for the first time added to science (*Phanerosteon*, *Holurus*, *Canobius*, *Cheirodopsis*, and *Tarrasius*), of which one (*Tarrasius*) is altogether so peculiar that no place can be found for it in any known family. To the family of Palæoniscidæ fifteen new species and three new genera are added. The most abundant species is a form of *Rhadinichthys*, which occurs also on the north side of the Silurian barrier. Another fish of common occurrence in the latter region is *Eurynotus crenatus*, of which only a single scale has been found in the Eskdale and Liddesdale region. A third species common to the two sides of the barrier is probably *Wardichthys cyclosoma*. But with these and possibly one or two other exceptions, all the fishes in the southern area are as yet peculiar to it, while at the same time the common forms of the Lothians are conspicuous by their absence in Eskdale and Liddesdale. These facts suggest interesting problems in Carboniferous geography and in ancient zoological distribution.

Without entering here into structural details, we may refer to the peculiarities of one or two of the new forms described by Dr. Traquair. He proposes the term *Phanerosteon* for a genus of Palæoniscid fishes, possessing a fusiform body, apparently for the most part devoid of scales, with a peculiarly rounded off dorsal fin, and destitute of fin-fulcra. If the nakedness of the body be due not to the non-preservation of scales, but, as seems almost certain, to the original absence of them, we are here presented with a Palæoniscoid fish showing a condition of squamation almost identical with that of *Polyodon*. Only one species, but a number of specimens of it have been obtained. The new genus *Holurus*, though placed by its author among the Palæoniscidæ, offers in its non-bifurcated caudal and rounded long-based pectoral fin a contradiction to his definition of this family; but the cranial osteology is in the main so decidedly Palæoniscid that he prefers to regard the genus as standing most fittingly where he has put it. Two species are described. Still more aberrant from the typical Palæoniscidæ is the genus *Canobius*, which to the general configuration of the family unites a disposition of the suspensorial and opercular apparatus almost identical with that of the same parts in the Platysomid *Eurynotus*. Four species are described. But the most remarkable of all this singular group of fishes is included by Dr. Traquair in a new family, to which, from the more characteristic of two specimens having been found at the foot of the Tarras Water, he has given the name of Tarrasiidæ. *Tarrasius*, the typical and only known genus possesses rhombic, minute,

shagreen-like scales, persistent notochord, well ossified neural and hæmal arches and spines, with the slender interspinous bones penetrating between the extremities of the vertebral spines as in teleostean fishes, and a long dorsal fin composed of closely-set jointed rays. Only two specimens, conjectured to belong to the same species, have as yet been obtained. Their state of preservation is such as to leave in doubt some important parts of the structure of this curious fish. It is to be hoped that future exploration in the same prolific locality may furnish Dr. Traquair with additional evidence on the subject, and enable him to complete his work.

Associated with the skeletons of the fishes are the remains of some new phyllopod and decapod crustaceans, which have been worked out by Mr. B. N. Peach, the Acting Palæontologist of the Scottish Geological Survey, who has described them in a memoir also communicated to the Royal Society of Edinburgh (*Trans. Roy. Soc. Edin.* vol. xxx. (1881) Part 1). The Phyllopods consist of two new species of *Ceratiocaris*, which differ from the Silurian species of this genus in having the body relatively much larger than the carapace. The numerous specimens are in a good state of preservation, one individual having been found with its intestinal canal distended with food. Of Macrurous Decapods several new species occur that differ in no essential respect from their living representatives. They belong to the genera *Anthrapalæmon*, *Palæocrangon*, and *Palæocaris*, upwards of forty specimens of one species of *Anthrapalæmon* having been obtained. Mr. Peach has worked out their structure with great skill. Among his observations is the occurrence of abundant minute calcareous calculi on the tests of these crustacea, precisely like those of the common shrimp.

One of the most singular features in our recent additions to the palæontology of the Lower Carboniferous rocks of the Scottish Border is the abundance in which the remains of scorpions have been discovered. The existence of these arachnids (*Eoscorpius*) in strata of this age in Scotland was made known some years ago by Dr. H. Woodward. But we are now in possession not of mere single and imperfect fragments, but of numerous and often admirably-preserved specimens which have enabled Mr. Peach to work out the structure of the insects in great detail. In anticipation of the early publication of his descriptions the following notes may be given here. He finds that these Palæozoic forms differ in no essential respect from the living scorpion so far as regards external organs. He has recognised in them every structure of the recent form, down even to hairs and hooks on the feet. The sting alone has not been certainly observed, but that it existed may be inferred from the presence of the poison gland which Mr. Peach has detected in the fossil state. The chief difference between the living scorpion and its ancient progenitors lies in the fact that in the fossil forms the mesial eyes are much larger in proportion to the lateral ones, and also to the size of the whole animal. The two mesial eyes are placed on an eminence near the anterior margin of the carapace formed by two converging tubes, and so arranged that the creature could look with them upwards, outwards, and forwards. There are at least four lateral eyes on each side. The mandibles, palpi, and four pairs of walking legs are beauti-



fully distinct on many specimens. The combs are much like those of the modern scorpion, but with a very remarkable sculpturing which at once recalls that so characteristic of the Eurypterids. The genital orifice, combs, and eight breathing stigmata occupy positions similar to those of the same organs in the modern scorpion. As regards theories of descent these fossils afford no more help in tracing the pedigree of the scorpion than is furnished by the living form, for it is obvious that the scorpion has remained with hardly any change since Carboniferous times. There can be little doubt that it is the most ancient type of Arachnid, whence the others have been derived.

Since the first specimens of scorpion were found by the Geological Survey among the Lower Carboniferous beds of the Border further research has brought many more to light from other and distant parts of the country. No fewer than five species belonging to a single genus (*Eoscorpis*) have been recognised by Mr. Peach, some of which must have contained individuals eight or ten inches in length. Most of these specimens, and also the crustacea and fishes above referred to, have been obtained by the Survey fossil-collector, A. Macconochie.

One further interesting fact deserves mention here. When the Geological Survey first began its work in Scotland, and was engaged in mapping the east of Berwickshire and Haddingtonshire, a remarkable and hitherto unique specimen was found there which was described by Salter under the name of *Cycadites Caledonicus*, as the most ancient cycad yet known. Among the specimens recently collected by A. Macconochie from the Border ground are several apparently of this same form which are so well preserved as to show that they are not plants at all. They occur together with species of *Eurypterus*, and are almost certainly a yet undescribed comb-like organ belonging to that creature. This fact, coupled with the singular eurypterid-like sculpture on the combs of the fossil scorpions, lends support to the suggestion which has been made that the eurypterids are ancestral aquatic arachnids.

ARCH. GEIKIE

#### THE HEAD-HUNTERS OF BORNEO

*The Head-hunters of Borneo: a Narrative of Travel up the Mahakkam and down the Barito; also Journeys in Sumatra.* By Carl Bock (late Commissioner of the Dutch Government). With thirty Coloured Plates, Map, and other Illustrations. (London: Sampson Low, Marston, Searle, and Rivington, 1881.)

THIS large and lavishly-illustrated volume derives its chief value from the fact that the author is a clever artist, and that all the handsome coloured plates which form the main feature of the book are evidently careful drawings made on the spot, not imaginary designs concocted from more or less imperfect sketches or descriptions. The houses, villages, and forest scenes are all true to nature, and the same may be said of the numerous portraits of the Dyaks and illustrations of their domestic life and customs. The figures are indeed wonderfully life-like and the drawing accurate, the only fault being a very slight tendency to Europeanise the features—a kind of personal equation due to Mr. Bock's artistic studies having been made from European models. This

is visible in the small and well-formed mouths of the two women in Plate 16, and in the perfectly straight and well-developed nose of the "Chief of the Forest People" in Plate 24. When, however, he has taken special pains and has had ample time to finish his drawing, as in "Hetdung, my favourite Dyak Boy" (Plate 23), he avoids this fault, and gives us a portrait as perfect and as characteristic as a good photograph.

Mr. Bock went out to the East to collect birds in Sumatra for the late Marquis of Tweeddale, and spent about nine months in that island. He was then employed by the Dutch Government to make an excursion through the interior of Borneo, to report on some of the Dyak tribes and collect specimens of natural history for the museums of Holland. This journey, which occupied in its preparation and execution about six months, was partly over ground new to European travellers; first to the country of the Poonau Dyaks in about 1° 40' N. lat., 116° 30' E. long., and then up a western tributary of the Mahakkam or Koti River, and overland for a short distance to the head waters of the Teweh, a branch of the Barito or Banjermassin River. This watershed is in about 0° 5' S. lat. and 115° 35' E. long., and appears to consist of an undulating country with a few detached hills. It is however marked by a curious geological phenomenon very rarely met with in the tropics, a large area covered with huge angular rocks, of every shape and size and tossed about in the greatest confusion. It is called by the natives *Jalan batu*, or the Stony way, and our author's description of it will bear quotation:—

"Covering an area of several square miles, and cropping up as it were in the centre of a vast forest, this Field of Stones is well calculated to arouse the superstitious dread of a savage people. Here scattered in wonderful confusion like the remains of a ruined castle: there standing erect and orderly as if carved by chisel and levelled by plumb-line and square: some in ponderous masses as large as a house, fifty or sixty feet in height and of still greater width and thickness: others heaped like so many petrified cocoa-nuts, or like a pile of forty-pounder cannon-balls: here bare and gaunt like the pillars of Stonehenge: there moss-covered and decked with ferns or gorgeous flowers: in all directions for miles and miles the stones lie scattered. Some of them have assumed fantastic shapes, in which the imagination can easily picture a travesty of the human form, or of other familiar objects: others again are marked with quaint devices, where wind and rain have put finishing touches to natural cracks and crevices, and made them assume the appearance of deliberately carved inscriptions, like those seen on ancient weather-beaten tombstones—or rather, like the curious 'picture-writings' found on scattered stones and rocks in British Guiana and other parts of South America. . . . For miles our route lay through this wilderness of sterility and fertility combined—sometimes creeping between two parallel walls of stone, thrown so closely together that there was scarcely room to walk sideways; sometimes making a considerable *détour* to avoid a more than usually rough spot. In some places the earth was covered with small loose stones, most difficult and painful to walk over; in others, the ground seemed to be of solid rock, and great care was necessary in walking to prevent one's feet being fixed in one of the innumerable crevices, which were the more dangerous from being partially covered by vegetation. Many of the large stones were so lightly balanced on a small foundation that it seemed as if the exercise of a moderate force would be sufficient to overturn them."